Resource Recommendations

Session Report: 10:30-11:15 AM, February 22, 2006

Need Workshops:

- to foster contemplation.
- for "mountain-top" experiences. Target department chairs or perhaps tenured geoscience and math faculty together.
- to foster an attitude change in faculty.
- for geoscience and math faculty to talk about curriculum reform within geoscience (math skills teaching) and to discuss revision of service courses in math curriculum to meet geoscience needs. Potential partnership with National Numeracy Network (July 27 in Seattle meeting).
- with geoscience, physics, and chemistry (perhaps with math, biosciences, statistics) to discuss the use of quantitative skills across the sciences.
- to develop packaged materials available on-line to support geoscientists from a variety of disciplines in teaching math course(s) for the geosciences.
- focused on quantitative reasoning at entry level.
- focused on infusing quantitative reasoning across departmental curricula (geoscientists from departments who have done it and from departments that would like to).
- to develop an example of a math capstone course.

Find opportunities to talk with leaders in mathematics education (NNN, MAA, ASA).
SERC should develop a set of shared data that shows:

- programs' expectations for incoming grad students and exiting undergraduate students.
- the breadth of cognate requirements for majors.
- info on the success of exiting students.
- a compilation of statistics that demonstrate the inadequacies of existing programs or the needs for better preparing students, with the aim of providing supporting materials that department heads can present to administrators in justifying proposed changes (faculty lines, course changes, etc).

On-line supporting materials for faculty and departments

- Specific examples of quantitative exercises for individual classes
- Philosophy of how to structure a course (e.g. order of introducing material in introductory physical geology course)
- Useful 'tidbits' that provide illustrative analogies or metaphors for thinking about difficult concepts
- Data sets (e.g. discharge records) that can be used for developing quantitative exercises
- Sample syllabi for various core geosciences courses, including notations on how to embed quantitative skills in each course and links to exercises
- Sample problem sets, labs and lab syllabi for core geosciences courses
- Justification for the importance of quantitative skills to all students, with the intent that this justification can be used by faculty members to support

proposed changes in discussions with students, other faculty, and administrators across disciplines
- Outreach exercises designed for faculty involved in K-12 programs and aimed at high school and undergraduate counselors and advisors for student who have not declared a major
- Examples of programmatic matrices showing quantitative and other skills distributed across curricula. A tool that would help departments develop a matrix like this could facilitate the data collection.
- Examples of math reform done with math department
- Examples of ways to value and reward efforts to reform curricula

On-line supporting materials for students
- Expanded resources for students in a printer friendly format
- Problems indexed by skill and topic with answers available
- Library of references collected from faculty and graduate students that deal with quantitative skills at the chapter/skill/problem level.

SERC needs new structures and functionalities for finding things in the site.